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(54) ELECTROWINNING OF METALS

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ABSTRACT

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An electrolytic process and electrochemical cell for the electrodeposition of a metal from an aqueous solution of a salt of said metal is disclosed. A separator which ^{has} comprises an anion exchange membrane which is substantially impermeable to cations is disposed between the anode and cathode of an electrochemical cell to form separate anode and cathode compartments within said cell, and a particulate cathode is established within the cathode compartment. The aqueous solution of a salt of the metal is flowed into the cathode compartment, and a potential difference is imposed across the anode and cathode of said cell sufficient to electrodeposit metal from said aqueous solution on to the particulate cathode, anions passing through said anion exchange membrane into the anode compartment.

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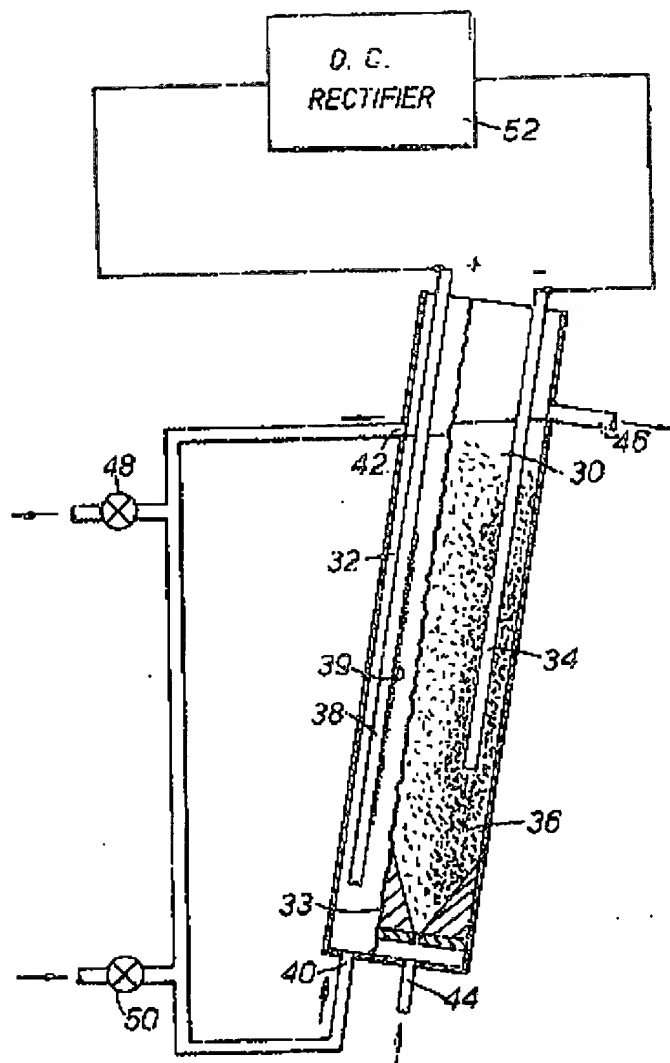
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THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An electrolytic process, for the electrodeposition of a metal from an aqueous solution of a salt of said metal, which process comprises the steps of disposing between the anode and cathode of an electrochemical cell a separator which has an anion exchange membrane which is substantially impermeable to cations, so as to form separate anode and cathode compartments within said cell, establishing within said cathode compartment a mobile bed particulate cathode, flowing said aqueous solution into said cathode compartment, imposing a potential difference across the anode and cathode of said cell sufficient to electrodeposit metal from said aqueous solution of a salt of said metal on to the particulate cathode, and allowing passage of anions through said anion exchange membrane.
2. A process according to claim 1, wherein said metal is cobalt or nickel.
3. A process according to claim 1, wherein there is flowed through the anode compartment an anolyte whose hydrogen ion concentration is maintained at a desired value by bleeding acid from the anolyte and replacing this acid with water.
4. A process according to claim 1, 2 or 3 wherein the anode is a dimensionally stable anode.
5. A process according to claim 1, 2 or 3 wherein the process is operated at a cathodic current density in the range 1500 to 5000 A/m² with respect to the active area of the anion exchange membrane.
6. An electrochemical cell, suitable for use in the electrodeposition of metal from an aqueous solution of a salt of said metal, wherein the cell is provided with a separator which is disposed between the cathode and anode of the electrochemical cell so as to form separate anode and cathode compartments within said cell and which incorporates an anion exchange membrane, and wherein the cathode compartment contains a mobile bed particulate cathode.

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